LITHIUM BROMIDE AIR CONDITIONING PLANT STANDARD ENGINEERING DEPARTMENT LOG

637 CL SUBMARINES

(*)NOTE: Circled figures are critical values requiring shutdown and/or immediate corrective action.)

FOR OFFICIAL USE ONLY

Special Instructions: *See reverse for important notes (1) - (10); Equilibrium Diagram; Watch Hours/Comments; and Signature blocks.*

USS	SSN	DATE	ENGR LOG NO (FILE BY)

HOURLY CHECKS	MAX	NORM	MIN	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. Evaporator Absolute Press in Hg ABS	.36	.28(-)	*(.20)																								
2. Generator Pump Disch Press PSI	10	4.5(-)	2																								
3. Absorber Pump Discharge in Hg VAC	5	10	13																								
4. Refrigerant Pump Discharge Press PSI	9	4.5	0																								
5. Strong Solution Temp. °F	*(225)	204 to 220(-)	154																								
6. Refrigerant Overflow Temp. °F (Note 3)	90	60-70	*(35)																								
7. Vapor Condensate Temp. °F (Note 8)	*(115)	109(-)	95																								
8. Sea Water in Absorber °F	89	85(±3)	81																								
9. Sea Water out Absorber °F	99	94(-)	85																								
10. Sea Water out Condenser °F	106	101(-)	90																								
11. Chilled Water Inlet Temp. °F	56	52(-)	45																								
12. Chilled Water Outlet Temp. °F	49	45(-)	*(38)																								
13. Chilled Water Flow in H2O	150	80	*(45)																								
14. Strong Solution out of Ht. Exch. °F (Note 2)	161	149(-)	119																								
15. Absorber Sump Level In	6	3-4(±)	*(1)																								
16. Air Press PSI (Note 4)			3																								
17. Steam Press PSI	*(33)	30(-)	4																								
18. Purge Pump Disch Press PSI (Note 5)	61	50±5	39																								
19. Refrigerant Pump Suct. Temp. °F (Note 2)	48	44(-)	*(35)																								

DAILY CHECKS	MAX	NORM	MIN	TIME 0000	TIME 1200
1. Weak Solution Specific Gravity (Note 6)	1.72	1.71(-)	1.60		
2. Weak Solution Sample Temp. °F (Note 6)	1.03	97(-)	86		
3. Weak Solution % Concentration (Note 7)	61	60(-)	52		
4. Purge Tank Specific Gravity (Note 6)	1.63	1.56-1.62	1.55		
5. Purge Tank Sample Temp. °F (Note 6)	70	45-69	44		
6. Purge Tank Concentration %	56	52-55	51		
7. Refrigerant Water Specific Gravity	1.01	1.00	0.99		

DAILY CHECKS	MAX	NORM	MIN	TIME 0000	TIME 1200
8. Generator Pump Suct. Temp. °F (Note 2)	107	104 (-)	90		
9. Absorber Solution Sat. Temp. °F (Note 7)	47	43(-)	34		
10. Absorber Temp. Spread °F (Note 7)	3	1	0		
11. Equilibrium Diagram Plotted (Note 9)	☐Yes ☐No				
12. Condenser Leak Detection fwd PSI/in Hg	10	0	5		
13. Absorber Leak Detection fwd PSI/in Hg	10	0	5		
14. Condenser Leak Detection aft PSI/inHg	10	0	5		

DAILY CHECKS	MAX	NORM	MIN	TIME 0000	TIME 1200
15. Absorber Leak Detection aft PSI/inHg	10	0	5		
16. Purge Tank Level In.	14		8		
17. Charge Adjustments gal.	Initial	Added	mvd gal.	balance	
17a. Refrigerant (Note 10)					
17b. LiBr Solution (Note 10)					

LITHIUM BROMIDE AIR CONDITIONING PLANT
STANDARD ENGINEERING DEPARTMENT LOG (CONTINUED) 637 CL SUBMARINES FOR OFFICIAL USE ONLY

NOTE: See Diagram - Notes (1) - (10) Below. Continue notes on log comment sheet if additional space is needed. DATE

TIME	NOTES	TIME	NOTES

SIGNATURE OF LPO	DATE SIGNED	SIGNATURE OF DIVISION OFFICER	DATE SIGNED	SIGNATURE OF ENGINEER	DATE SIGNED

NOTES 1 THROUGH 10

1. NORM. Values are design readings at full load conditions. "(-)" after the value indicates that it decreases at lower air cond. loads "(+)" indicates that it increases with decreasing load. The remaining values should remain relatively constant.

2. This temperature may require a temperature dial thermometer or similar (NSN 6685-00-373-3436).

3. Temperatures lower than normal indicate refrigerant overflow.

4. Ships with 20 PSI air use: NORM 20(-). MAX 21. Ships with 15 PSI air use; NORM 15 (-). MAX 16. Air pressure denotes air signal to steam valve.

5. Purge pump should not normally operate unless the steam valve air pressure increased to 15 PSI and is still at least 12 PSI. Pump pressure should then be 45 - 55 PSIG.

6. Specific gravities and assiciated temperatures are measured using Carrier Test Kit. (NSN 9G-4120-00-797-8648) or similar. All samples are to be recharged into plant.

7. The absorber solution saturation temperature and absorber spread are as follows:

   a. On equilibrium diagram, locate intersection of weak solution specific gravity and sample temperature.xtend a vertical line upward until it ntersects with the generator pump suction temperature, then horizontally to the right edge of the diagram. The corresponding value is the absorber solution saturation temperature.

   b. Determine the difference between the solution saturation temperature and refrigerant pump suction temperature. This is the absorber spread. Changes via the running vacuum test may indicate the presence of noncondensible gases providing that the purge system is secured.

   c. The solution conctentration is sdetermined by extending the intersection of the generator pump suction temperature and specific gravity vertically, to the bottom edge ot the diagram.

8. Vapor condensate temperatures less than 2°F higher than condenser seawater outlet temperature indicate blocked condenser drain llines. Symptoms may be sporadic, include overconcentration of lithium bromide solution and cause lower than normal sump level, particularly noticeable at higher air con ditioning loads.

9. Lithium Bromide Equilibbium Diagram:

   a. Plot "A" represents a typical plant operating at 10% capacity.

   b. Plot "B" similarly represents a plant operating at 100% capacity.

   c. Taller and thinner plots indicate fouled seawater heat exchanger and/or air in plant.

   d. Smaller and wider plots indicate an overconcentrated solution and/or flow obstruction.

   e. Plot Equilibrium Diagram in accordance with NAVSEA 0959-035-4010, Section 3.2.15 for SSN 637 Classes or NAVSEA 0959-043-6010, Section 4.2.2 for SSN 637, 638, 639. Note that point 6 of equilibrium diagram cannot be plotted.

10. The proper lithium bromide plant charge is 140 gals, of solution at 53 % concentration be weight. The normal refrigerant charge is 65 gals. of water. Abnormal operating parameters are usually the result of blockages, air in-leakage, or poor heat transfer. Do not deviate from the specified amount of lithiumbromide solution or refrigerant water unless absolutely ncessary. Record all charge adjustments.